TRANSCRIPT OF PROCEEDINGS

NASA/JPL CERCLA RPM MEETING

Wednesday, January 28, 2004

John Muir High School

1905 North Lincoln Avenue

Pasadena, California 91103

7:42 p.m. - 9:24 p.m.

I N D E X

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ATTENDEES

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PHIL LA MORI

SHARON ROGERS

TIM BRICK

SID TYLER (COUNCILMEMBER, CITY OF PASADENA)

HEDY ABEDI

RON L. WOODFORD

BOB HAYWARD

MARAH LYVERS

ALAN SORSHER

INNA BABBITT

CORY NELSON

DORIS L. STEWART

ANN WIXTED

DEL HAUSMANN

KEDAR PHADKE

NAGARAJAN SIVAKUMAR

Pasadena, California, Wednesday, January 28, 2003

7:42 p.m.

MS. FELLOWS: Welcome to tonight's meeting on the JPL groundwater cleanup. I'm Merrilee Fellows. I'm manager of outreach for the groundwater cleanup. And I'm also going to facilitate the meeting tonight.

The first thing I want to do, though, is I want to have a brief announcement from our Spanish translator, Celina Pagini Tousigant.

THE INTERPRETER: Thank you.

Good evening. I'm Celina Pagini Tousigant, and I will be translating this presentation in Spanish tonight. What I'd like to do is check in the audience if there's anybody that needs a translation.

(Translated into Spanish.)

THE INTERPRETER: Okay. Well, if anybody needs a translation, I will be sitting in that corner, and we'll just leave it at that.

MS. FELLOWS: Thank you.

There are several purposes to tonight's meeting. One is, of course, to explain the technology of the treatment options for cleaning up the volatile organic compounds and perchlorate.

Another meeting is to -- another reason is to

assure you that the water you drink is safe and meets the regulatory standards.

The most important meeting -- reason, from my perspective, is to hear your comments, questions, and concerns. So I'm going to make a few brief housekeeping announcements, and then we'll have a few welcoming remarks, some technical presentations are very short, and most of THE meeting will be spent hearing from you.

We realize we haven't spoken with you in a long time, and we want to get into a routine of doing so.

Last night at our public meeting, I suggested that we do so at least quarterly. One of the issues that came up that made it clear there were a lot of concerns about health issues, so we've moved it up a little bit. We're going to have a meeting within two months to talk about health concerns, and we're committed to convening a group of people that includes local, state, federal, medical, and health personnel, as well as independent medical health personnel and yourselves.

We've talked to Ms. Benton about helping us and some others so you really understand what the issues are and how to address those for you.

And at the end of tonight, we have an evaluation card, and we'd like to have you fill it out to tell us, is this kind of format a good one for you? Is it

technological? Is it too technical? How frequently would you like to hear from us? Would you like to hear from us quarterly, or would you like us to alternate with maybe a newsletter? Maybe the newsletter more technical. You get the idea. Let us know what you think, and we'll try to respond to those.

You notice tonight that we have a court reporter here, and she's here for two reasons: One is to track the comments and questions that you make so that we know we've gotten them all down as you said them.

The other one is to ensure that we follow through on any commitments we make.

Last night, for instance, on the board I wrote down there were health concerns, and we wanted to convene some sort of meeting on health commitments, health issues, and we followed up with that.

A couple of other short items. We want to make sure you know about our website. It is http colon slash slash JPL water dot NASA dot gov. Note it does not have www in front of it. If you put that in, it doesn't work. So stick with this format.

And that is the administrative record for the -- for all the required documents. We're going to make it a little bit more user friendly as the next couple of months go by, so keeping checking that. There will be some new

items on there as well.

We also have comment cards. I don't know if those were passed out as you came in. And there's -- oh, good, you got some. There's a couple of boxes. One, you can check if you'd like me to ask -- to read your questions instead of you using a microphone and asking out loud. Another option is if you just want us to research it and get back to you on an answer, we'll be happy to do that.

A third way to use it is after the whole evening is over, take one home. If you think of another question you have, mail it in to us, and let us know.

We do encourage questions tonight. We also encourage that you sign in so that we can follow up and let you know about future meetings and make sure you get all the materials we distribute.

There are a couple of ground rules for tonight. One is that we'd like to, at least for the first round, limit you to one question and one follow-up, or if you make a comment, try to limit it to about two minutes. And if we get through the whole group and we still have time, we'll start through again and give you a little more time.

And now, as a measure of the importance with which NASA takes this effort, the fact that the No. 2 person at NASA, Deputy Administrator Mr. Fred Gregory, has offered to be with us here tonight. He's a former

astronaut. He was the first African-American commander of a space shuttle, and he's recently been inducted into the astronaut hall of fame.

He's here to make some opening remarks.

Please help me welcome Mr. Gregory.

MR. GREGORY: Thanks, Merrilee.

I see some friendly faces from last night. And I want to welcome you, and you're going to hear the kind of initial opening that I started last night where I talked about the heat of Southern California and how it's so different from the cold of the East Coast.

Now, I saw people out in the lobby as I came in who were complaining about the coldness. Let me tell you, I'm sweating. So I guess it's all kind of relative.

I have been to this area in California three times in the last, oh, week and a half, I suspect. I was out on the 14th of January with the vice president and had the honor of announcing him, introducing him at the Jet Propulsion Lab as he wandered around and looked at the Mars -- the Mars Rover team at the Jet Propulsion Lab. So it was kind of in between Spirit and Opportunity.

He was very excited about his visit here. And I think it was the first time -- well, it was certainly the first time he had been here, and we were looking back at when a vice president or a president had attended or been

present at Jet Propulsion Lab, and I don't think we ever came to a solid count on it, but it was just probably several times in the last 20 or 30 years.

At the same time, the president was in Washington talking about the exploration vision, and that was certainly the first president ever to visit NASA headquarters to talk about where we're heading.

Then I was here just last weekend, and I was here for the Opportunity landing. And then I came in again on Tuesday, and so I think a couple more times I can ask for citizenship here. I think maybe another two or three times in the next month.

I have the role in the agency as the one who tries to step in when there is a problem of sorts. And it doesn't matter whether it's a spacecraft that's gone amiss or human resource, human capital issues. But when I started in this role of the chief operating officer of NASA, probably a year and a half ago, a little over a year and a half ago, I was told about the issue of the water quality associated with the Jet Propulsion Lab. And I asked to come out and be with the communities, the water authorities, for both Pasadena and Lincoln Avenue.

And so, unknown to you all -- I think it was about a year ago -- I came and met with Phyllis and other community leaders to talk about what the issue was, what

had happened in the past.

And as I listened there, it was clear to me that if we were supposed to be listening and communicating, it was clear that we, NASA, we weren't doing that at all.

And so just like the way I kind of attack everything else, I just kind of draw a line in the sand and say, "Okay. I can't do much about the past, but I can, from this point on, make it work."

And so I went back and challenged the NASA headquarters team to really begin to look at what the problems were and how we were failing. And what you have seen, I would hope, and I'm certainly not the one to tell you what you've seen, what we have done, what we have attempted to do, is to put in a very strong team that understands not only the technical issues, but also understands communication; how you talk about it, how you explain, how you not defend, but tell you how and what the situation is and what NASA is doing to solve it.

I think you know that NASA was not the one who injected or provided the contaminants that we will be talking about. NASA, in 1958, became the owner of the Jet Propulsion Lab, and the contaminants that we are talking about were contaminants that were introduced into the water table, the aquifer, years before that.

But NASA, just as you would expect any good

neighbor, is doing the cleanup just because, shoot, we ought to do it. And we're not worrying about who it was that put it in. That's not even a concern.

The other thing is we're not worrying about who's going to pay for it. We're going to pay for it.

And so what I wanted to do, when I was out earlier, I gave Phyllis a commitment about we were going to work it, we were going to work it hard, and we were going to solve this problem as quickly as possible.

And so I'm here tonight just to reaffirm the commitment that I provided to Phyllis a year ago and to Bob Hayward in the summer, in last summer, that NASA's doing everything it can to solve the issues, communicate the problem, clean up as quickly as possible the contamination that is in the groundwater.

But at the same time, we have assembled a group of experts here this evening who should be able to answer -- these are not NASA people. There are NASA people here, but these are not NASA people who will be answering the questions. They will talk about the water quality at the pumps. They will talk about what happens when you exceed a minimum level or a safe level. There will -- I think we have some experts in the audience tonight who can talk about medical issues.

So I believe we're going to have a separate

session, I think in two months, as Merrilee announced, specifically on medical issues.

But I have -- I think we've put in a good team. You're the ones who will have to say "Yes, we have," or "No, we haven't," or "We're making progress" or "We're not making progress," "You're communicating," "You're not communicating." I mean, you all are the ones who live here daily, who drink the water, who live and have an expectation of a quality of life.

I live on the East Coast. But I'm going to be here as often as possible to at least be able to stand up in front of you to say "We're doing our best, how can we do even more?"

So you have met Merrilee, and she's responsible for communication. And we've got Myrna Guiterrez here, who will be also part of that team. And this isn't a rocket scientist, but this is a guy, Steve Slaten, who has been in the midst of cleanups for a considerable amount of time, and he has just recently joined the team here to work with Phyllis and Bob and the Jet Propulsion Lab, and hopefully you, to make sure and make certain that we do the right thing.

So I want to thank each of you for coming and providing this excellent warm weather for me here. And I have to leave tomorrow morning to go back to what has been

a trend in the Washington area of almost three weeks of below zero -- I mean, no. Well, zero centigrade, but below freezing.

And I know that people here have never experienced any of that, but I will offer you the opportunity, if you ever want to come east and spend some time in the cold, just call me, and we can wander around together. I will show you what sweatshirts look like and layering and things like that.

So thank you very much.

Merrilee, let me give it back to you.

MS. FELLOWS: Mr. Gregory's comments remind me to say that both Steve and I are NASA employees, and I live in Pasadena. I've lived here about 30 years in this area. So it's with great pleasure that I want to introduce the general manager of my water purveyor, Pasadena Water and Power, Ms. Phyllis Curry.

MS. CURRY: I briefly want to say good evening to you. Welcome you to this forum. I think this is a significant event.

As Fred said, about one year ago almost to the day, he came to Pasadena, met with the City Manager and I, and made a commitment that, regardless of what had happened in the past, that he would see that they moved aggressively to clean up our water.

Now, I want to make one thing very clear to you. The water we're serving you does not have perchlorates. And that water meets all the State standards.

Pasadena Water and Power made a decision when a lot of the standards about perchlorates were changing because of studies done by EPA that we would shut down even more of the wells than had been shut down before. We now have approximately nine wells shut down.

But what that means is we have to buy more water from the Metropolitan Water District. Now, they have had some perchlorate issues of their own that they're trying to get on top of, but because of the mix of the waters, what we serve you does not exceed any of the State standards for any of the contaminants. So we will continue to make that commitment to you. We will not serve you water that does not meet State standards.

So I'm not going to take a lot more time. You're here to get some information that I think will be very useful. It really is a part of understanding the process, the treatment that is being proposed in order to ensure that we don't have this problem in the future and that we get the use of our groundwater back.

That is a financial issue that you should all be very concerned about because our groundwater is our cheapest resource. Using that groundwater means that our

costs go down. It means your bills go down. And that's part of my job, to make sure that we serve you clean water that meets State standards, but that we do it at the lowest cost.

So again, I won't belabor the point, but welcome. I hope you will find this very informative, and it will not be the last time that you hear from us on this subject.

Thank you.

MS. FELLOWS: Now, I would like to introduce Steve Slaten. He's the relatively new remedial project manager for the cleanup.

And Steve.

MR. SLATEN: Good evening. I'm going to try to remember to keep the microphone up. I tend to let it go down, so if I do that, just remind me. If you can't hear me, let me know.

My name is Steve Slaten, and I am the NASA project manager for this cleanup project. I have experience at other federal government sites doing other cleanups, and I bring that experience here to try to move this project along in the best way we can.

I just thought I'd start, before I go into my technical slides and things like that, just to give a little overview of the history, the story of what has gone on.

Some people know it, but just to sum it up pretty quickly, in the 1940s and '50s, there were activities out at JPL, in which they generated waste, and the common waste management practice at that time was to dig a hole in the ground to pour in the waste. And they did this for wastes out there. Those wastes then made their way down to the groundwater, and they have moved under the water at JPL and under the water adjacent to JPL. So I'll give you more details on that in a minute.

In the 1980s and '90s, we were detecting these chemicals in the groundwater in off-site wells, and we started taking action then for some of the chemicals, to clean them up. And in the 1990s, some plants were built that NASA paid for to clean up groundwater.

But then a new chemical came along that people started understanding how to watch for and how to measure for it. That one is called perchlorate. And so in the '90s, that became an issue, and more wells were shut down. And over the last few years, the treatment technology -- all right. I heard the other one was cutting out, but I couldn't hear that.

All right. Over the last few years, treatment technologies have been developed to treat for this perchlorate. So our plan is to clean up the sources of the perchlorate, clean up the groundwater with perchlorate,

bring it up and treat it, and have left with water that meets all the drinking water standards. I'll describe that in more detail.

In the last few years, what we've done is we conducted five pilot studies where we tested different types of technologies to see if they were effective in removing perchlorate. And I'll talk about two of those most promising technologies tonight.

So I'm ready for the first slide, Keith.

Okay. I'm going to try using my pointer tonight and still turn around and not turn my back to you too much. So I'll be turning back and forth to look around.

Most people will recognize the map. JPL and the Arroyo Seco -- this looks like -- they call this a reservoir, but most of you know that it's dry almost all of the time. And then the city of Altadena, Pasadena, La Canada, Flintridge.

Okay. My favorite slide.

Oh, okay. I wanted to talk -- tell you a little bit before I went too far into it, what these chemicals are, just a little bit about these chemicals. So maybe I'll just talk to it and not point because I'm having trouble turning around back and forth.

Okay. I'll start out with carbon tetrachloride, talking about that one. That's one of the volatile organic

compounds that we have that was disposed and has migrated in the groundwater.

Carbon tet, commonly called, has been a common cleaning agent, degreasing fluid. It's also found in some other things that you probably used at one time or another, in spot remover on clothes, at least in the past. It's hard to get those good spot removers anymore. Refrigeration propellants. So that's some of the common uses.

The other chemical that we most commonly find is trichloroethylene, TCE. It's also another volatile organic compound. I may use the term "VOC." It's a solvent, a very good solvent, removes grease from metals. It cleans things up. It also has been used in other things, adhesive, paint remover, typewriter correction fluid, and spot removers.

The other -- the non-VOC -- these are VOCs. The non-VOC and the newer chemical that we're interested in focusing cleanup on is called perchlorate. It's a major component of solid rocket propellant, and it's also -- you can see it has been used for some other similar uses; fireworks, munition, flares, air bags. It does occur in fertilizers which has some component of fertilizer that's mined in Chile.

So let's go now -- okay. These chemicals that

I've been talking about were disposed at the surface. Shallow pits were dug up to 30 feet deep or so at the surface. They're poured in. They are heavy and tend to sink right down through the gravel and sand that's near the surface until they reach the water table.

Here is the aquifer, and this is the area that's saturated with groundwater. The chemicals will reach here. They all dissolve in water so that there may be pure chemical that has made it down to the water, but then it dissolves in the water. And all these chemicals do dissolve, and the water tends to move and flow underground.

And it has moved and flowed off of the JPL property, under the Arroyo Seco, several hundred feet deep. As you can see, there's about 250 feet of dry soil above the aquifer, and then there's another couple of hundred feet where the plume has died down as it's traveled off and moved.

So there -- an important point to note is that there is no pathway between where the chemicals are in the groundwater off-site and the surface because there's several hundred feet of water and dry soil between the surface and where the chemicals are.

But the real issue here is that it has moved to wells. It has moved to several of the City of Pasadena wells. One well we showed you here is the Arroyo well,

which is right on the edge of the Arroyo. It has moved well into this area. It is also continuing to move further, and it's reaching other wells, and we don't know yet what the full extent of it is.

One of the things I have to do, part of my job, is to get out and put in more monitoring wells and find the full extent of where this is. Because what we have to do now, and what I'll be talking about more, are the actions to actually put in the system that will remove this water, suck it out, take it over onto the plant site and treat it.

We also have another system which is going in, which we're groundbreaking just next month, where we will put wells in, which will suck up these higher levels that are near the source and stop any further spreading. We need to get control on both the higher levels near the source so they don't continue to move, and we need to get out here and capture this and pull it back so it doesn't continue to move.

Next slide.

Okay. This is the slide that shows the map similar to the one above, but I've tried to show the area that's underground, several hundred feet underground, as I said, but it has moved out into an area out here some hundred acres or so, that we know, that it's under -- off

of JPL property and in the deep groundwater. It also exists under JPL in the groundwater. This is the general area.

Next slide.

Okay. I'm going to use this slide to do my explanation of how we're going to remove and reinject groundwater.

First, as you can see from the darker color, this indicates the area near the original disposal where the levels are highest. It is -- as I said, the chemicals travel down to the groundwater, dissolve, and then (inaudible) in the deep groundwater under this area.

In this area we are, next month, breaking ground to put in a system where we will install extraction wells. We will bring the water up, run it through a treatment system, and reinject clean water. And it's in a small area, and it's going to be something of a closed loop of water that is pulled up, treated, reinjected, pulled up, treated, reinjected, so we can clean out that area where the higher concentrations are.

Following behind that in the next few months we're going through plans to put in a system where we will extract water from this area, bring it back over onto plant site, treat it on plant site, treat it to drinking water levels, and then we're going to reinject it over on this

side of the plant site, back into the same aquifer. And then later, after we have reinjected, this water could be made available for the City of Pasadena to use.

Next.

Okay. I'm going to talk a little bit about two technologies that are under consideration for use to clean up the groundwater.

The first technology I call -- we call ion exchange. It's actually very similar to a home water softener in which first the groundwater is pumped up, the volatile organic compounds are removed with a carbon system.

A carbon system is a tried and true, common and very effective method for removing volatiles from water. However, the carbon system does not remove perchlorates, and we need another system to do that, and that is what we call the ion exchange.

These are the ion exchange vessels in this one. This photograph is of another existing ion exchange system that's operational somewhere else in the state.

The perchlorate is removed by the ion exchange. It actually sticks in here. The perchlorate is not destroyed. It remains in here. The water comes out that has now been cleaned of perchlorate and VOCs, and then the treated water will be reinjected for our off-site system.

This treated water may later be used by the City of Pasadena.

The one thing that's important about this, since the perchlorate is not destroyed, it is concentrated, and later, it has to be somehow removed and destroyed. So there is a waste product that comes out of this that still has perchlorate in it.

Next slide.

The other main -- the other type of technology that we call option 2 here is called a fluidized bed reactor. As with the other one, we pump up groundwater, remove the volatiles also with the carbon system. However, in this system, the big difference is there is a tank, a closed tank that is used in which there's live food grade bacteria that live in the tank, and they eat the perchlorate. They eat it for food. If you add some vitamins that help them, they will eat the perchlorate, actually destroy it, break it down, until it's just gone.

And then we will use the filter to remove any bacteria that may have come out of the tank. And then that treated water is ready to be reinjected, also may later be used by the City for water purposes.

So that's what I wanted to kind of go over quickly with people.

What I want to do now, Mark -- I want to

introduce Mark Ripperda. He's part of the cleanup team with EPA.

MR. RIPPERDA: Thanks, Steve.

My name is Mark Ripperda, and I'm an engineer with the United States Environmental Protection Agency. And my office is up in San Francisco. And my job is to oversee NASA in its cleanup effort. And I work with a couple of local State of California agencies.

This is Mr. Mohammed Zaidi from the Regional Water Quality Control Board of Los Angeles, and Mr. Michael Iskarous from the Department of Toxic Substances Control in Glendale. And it's all three of our agencies' jobs to make sure NASA is doing its cleanup right.

The reason we're doing this is because, back in the early '90s, EPA designated the lab as a Superfund site, both because of the complexity of the site and because the chemicals had reached some drinking water wells.

So as a Superfund site, they are subject to a whole set of laws, one of which is that the public has to be protected at any point in time. So as soon as chemicals are detected at a well, that well either has to get treated or taken out of service immediately.

The second part of it is that because the lab was responsible for contaminating the aquifer, NASA has to

return the aquifer itself to drinking water standards.

So NASA takes the lead on doing the work, but our three agencies review all the investigation plans, the work plans, and the final remedy decision and implementation.

There is another State agency that is very specifically responsible for drinking water quality. So any time water is being used by the public, they have to comply with everything that DHS, the Department of Health Services says. And I'll let Jeffrey O'Keefe tell you about that.

MR. O'KEEFE: Hi. I'm Jeff O'Keefe. I'm district engineer with the California Department of Health Services in the drinking water program, and my office is based here in Los Angeles.

Our agency is responsible for establishing drinking water standards, primarily in ensuring that the water utilities comply with the California and Federal Safe Drinking Water Acts.

A few of the other roles of our agency are that we permit water utilities to use treatment systems, and we also evaluate new or emerging treatment technologies.

For this project, we specifically would be issuing a permit to the City of Pasadena to allow them to use the treated water from the off-site wells, which there was a graphic earlier, there were two wells there called

the Arroyo well and the Well 52. So we would permit Pasadena to serve the water from that treatment facility.

And, of course, before we would issue that permit, my department has a very extensive evaluation process to make sure that the treated water is safe and protective of public health.

And at the end of that process, we would hold a public hearing ready -- when the facility is ready to start up, and that public hearing would be an opportunity for the public to express any concerns they have about that facility before the water could be accepted into the drinking water supply.

But I also encourage you to express any concerns you might have at any of these public meetings that are going to lead up to that in the future so we can hear your concerns, we can answer any questions you may have.

That's it. Thank you.

MS. FELLOWS: Thanks, Jeff.

Now we're about to open it to questions. I would ask you to raise your hand and wait until we get a microphone to you.

Also, it's not required, but if you would state your name, and you don't have to give an address, but maybe just the neighborhood or general area you're from. That would help us out.

And remember, there is a translator. If anyone needs one, let us know.

We have a hand up back there.

MS. STREETER: Thank you. My name is Joyce Streeter, and I'm a councilmember for this area, and the area that's polluted.

When will you make a decision about which option you're going to use, and what are the pros and cons of the two options?

MR. SLATEN: Okay. The decision -- the options that are being considered are for the off-JPL groundwater portion of this. We're already on our way to installing, on JPL, a system that's going to do the water under JPL. So the two systems I'm talking about are for the off-JPL water.

Next month, we'll be asking for proposals and bids from contractors to tell us which type of -- to give us bids on a system; how much it will cost, how it works, all the details will come in beginning next month.

So -- I'm sorry. I got that a little bit confused. I was talking -- okay.

Because there are two systems, I have to try to keep that kind of straight.

So for the off-site groundwater system, we have some -- we've been going through some planning stages, and

we're in consultation with our regulators and our partners. We have a document now that is getting close to being finalized, which describes the processes, and that will be going out for comment and should be available probably next month.

Now, the second part of your question was which system is better?

Both systems work. Both systems work well. Both systems have been used in other places. The ion exchange is a more -- is an older -- been around longer, more places have used that.

The fluidized bed reactor, which uses the food grade bacteria to destroy the perchlorate, is a newer process. Only in the last couple of years have people started using it and started using it successfully. So it doesn't have as long a track record. Although it is in use other places in the state of California, it's relatively new.

UNIDENTIFIED SPEAKER: The pictures show (inaudible) --

MS. FELLOWS: Wait for the mike, Jeff.

MR. O'KEEFE: Yes. Basically, what Steve said, I'm in agreement with that. But we have permitted a lot more of the ion exchange treatment system, and we have not yet permitted one of the biological processes for drinking

water application.

However, we had been involved with a plant, the same design, in the Sacramento area, and it's been operating now approximately roughly two years. And we have reviewed all of the quality and the operations of that facility, and it complied with all of our requirements. And we approved it for use in a drinking water application.

However, it just turned out with that project, it didn't go that route. It is going to be reinjected as the final use, and it's not directly served to the community there.

But we have reviewed it, we have evaluated the process, and it does allow the water to be treated to all of our standards.

MS. FELLOWS: Thanks, Jeff.

You're first.

MS. PRICE: My name is Sharice Price, and I'm a resident of Altadena.

The concern I have is with everything that's spoken about Pasadena Water Company. Lincoln Avenue Water Company is our private water resource. What assurance do we have that our water is being kept up to code, and if there's any backlash whatsoever that we should have, who would we contact and what resources do we have available?

MS. FELLOWS: Why don't you -- last night, we did have

a meeting in Altadena with the Lincoln Avenue Water Company, but we can repeat it again tonight.

Mr. Hayward and the safe drinking --

MR. SLATEN: Bob Hayward did speak last night. I will just sum up.

The reason Pasadena was mentioned several times tonight is because those wells have already been impacted. Those wells are closed already. And that's the area where we're going to pump from. We're going to use their wells or right by those wells to pump out water.

Now, actually, my favorite slide up there showed Lincoln Avenue Water Company wells. You saw that.

UNIDENTIFIED SPEAKER: (Inaudible.)

MR. SLATEN: That's right. That's correct.

We have an agreement with the Lincoln Avenue Water Company to take care of exactly these types of things. We've already paid for a volatile treatment system that they have. We have an agreement to take care of other issues. If their water becomes impacted such that they couldn't serve it to you, we have an agreement to make that right. We're going to stand by that, and NASA will make that right. That's the short --

MS. CURRY: Let me just add to that a bit. I don't see Bob here, but -- and I'm not going to propose to speak for Lincoln Avenue, but one of the general principles, I

think, that would address your concern is that the reason we know we've got a problem is because we have to test our water very consistently.

State requirements are very stringent. Federal requirements are very stringent. So we have to do a lot of testing. His agency, my agency, we test constantly. And so when we see that we're getting readings from a particular well that show that there might be a problem, that's when we have to take action.

With regard to Pasadena, our wells started showing these readings a lot sooner. And so that's what -- why the two wells that are shown in the picture were shut down.

Lincoln Avenue's situation is a little bit different, but they operate generally the same way in that, if they had a problem with a well, they would shut it down. They would look for an alternative source of water.

MR. SLATEN: Just to sum that up, the Pasadena wells were impacted first. The chemicals reached there first. The chemicals are continuing to move today, and that's why we have to get out there as soon as possible, put in a system to stop that movement and begin to draw them back to protect the rest of the groundwater in the other wells, and to start making the groundwater clean again.

MR. O'KEEFE: I just want to, you know, agree with

Miss Curry. Our program has very stringent monitoring requirements. I know for a fact that Lincoln Avenue is monitoring all their wells, and I believe they have taken some action to temporarily shut down wells that have been -- have had low detects.

And in the future -- I mean, the focus for this meeting is really on the higher level concentrations, both on the property and immediately adjacent to it. But in the future, there will be possibly other treatment systems installed to allow Lincoln Avenue to restore some of those wells that they lost. But right now, at the water (inaudible), they meet all standards.

MS. FELLOWS: Thank you.

Melody.

UNIDENTIFIED SPEAKER: I'd like to ask, what is the comparison of the amount of time that it would take to treat water comparing option 1 to option 2?

MR. SLATEN: There's no difference. These options are not about how long it takes to treat it. They would both work well. They both work at the volumes of water, the rate of water, the pumping rates that we need. Both options will do the job.

MS. FELLOWS: David, up there.

UNIDENTIFIED SPEAKER: Rick (inaudible), Altadena.

You mentioned that JPL already has a system in

place, and it's functioning. And if that's true, how -- are you getting the results that you were hoping for, and is this system one of the two systems that you presented?

MR. SLATEN: The systems that we have run -- in the past few years, we've done pilot studies, small scale systems that have only pumped a few gallons per minute on a very small scale to test the technology to see if it works. We do not yet have this larger scale system going in.

The first larger scale system is going to be the on-site, and we're groundbreaking next month. And by this summer, we should have it up and operating, and that will be the first one. And that system is in the process of being procured now, and we're moving as quickly as possible to get it in so that, for the source, the higher levels, we can catch those, contain them, so they do not continue to migrate and contribute to this problem.

MS. WARREN: Hi. My name is Sandra Warren, and I live on Crestford, and you can see JPL from my backyard.

And my question is, you're saying that you guys are going to start now, and this will probably be up and running by the summer. But when this gentleman spoke, he said you guys started detecting this stuff in 1980, and then, in 1990, you built some plants to clean up the water and shut down some wells.

So if that was done, I'm trying to figure out --

if you've already done that, what are you going to do different now?

MR. SLATEN: The earlier cleanups, the earlier plants, were for the volatile organic compounds, which we knew about and we knew how to clean them up, and that's been going on for some time. That goes on in a lot of places, and that's the earlier cleanup.

Perchlorate is the chemical that we started to find out about in the '90s. We started to -- there were methods, chemistry methods, analytical methods in the laboratory, to detect it, to find it, and that's when we started noticing the perchlorate.

Perchlorate is not removed by the same treatment systems that work so well for the VOCs. So now we have to put in treatment systems that have two parts to them: One part to get out the VOCs, which we've been doing for a long time, and a new part to take the perchlorate out of the water.

MS. FELLOWS: Let's go over to David over there.

MR. ALLEN: My name is Jim Allen, and I worked at JPL for quite a number of years.

You've indicated that you shut down about nine wells already. So how many are operational at this point in time?

MS. CURRY: That reference is to Pasadena's wells. We

shut down nine of sixteen wells. And then we just recently dug two new wells, but it's on the east side of Pasadena.

MR. ALLEN: How many are operational now?

MS. CURRY: Most are remaining. The seven that we had before and the two new ones.

MR. ALLEN: Is that water being provided to Lincoln Avenue Water as well as the Pasadena company's well?

MS. CURRY: No. Lincoln Avenue's water is coming from a different part of the Arroyo Seco. Pasadena is pumping water from the eastern side of the city. And then we're getting water from the Metropolitan Water District.

Now, I understand Lincoln is also getting some water from the Metropolitan Water District.

MR. ALLEN: I don't see how you can separate that based on the map you showed on where the water is located.

MS. CURRY: I guess I don't understand your question.

MR. ALLEN: Okay. Are you saying that some of the water is being provided to Pasadena and some is provided to the Lincoln Avenue?

MS. CURRY: Yes. The map that was shown --

MR. ALLEN: And we (inaudible) --

MS. CURRY: Okay. The map that was shown, shows you only a portion of the Pasadena system. It's only the portion that's up here in the Raymond Basin. It doesn't show you the mid city and the eastern portions. We don't

have a perchlorate problem on that side of town.

MR. SLATEN: That was my map attempting to show things that are near JPL. They own other stuff (inaudible) --

MR. ALLEN: Well, the water is underneath me, so I'm very concerned about it.

MS. CURRY: I understand.

MR. ALLEN: Based on your map.

MR. SLATEN: Okay.

MS. FELLOWS: Where is the gentleman that said I didn't recognize him last night, and he had his hand up a lot, and he was going to ask a question tonight, and I still don't see him.

Okay. I tried.

How about right here?

UNIDENTIFIED SPEAKER: Hi. I'm (inaudible), Altadena.

I just think it sounds like you have a plan and you're working with it, but could someone here explain -- I was reading in the newspaper last week about a lawsuit. And why is a lawsuit happening if everyone is together and everyone is taking responsibility about cleaning things up?

MS. CURRY: I would ask you to look at that -- it's not a lawsuit, first of all. It's a claim that would allow us to file a lawsuit later. And I would say look at that as our insurance. I mean, we're very happy with the progress that's being made. I'm optimistic.

But in the event that we're not successful in negotiating a settlement of what we believe are the damages that the City has incurred, then we might take further action. If we didn't file the claim that was in the paper, we wouldn't be able to take that action at a later date.

UNIDENTIFIED SPEAKER: And I have one other question, and that has to do with the soil contamination. Because I was a little concerned because some of the soil from south of JPL has been removed and put in the settlement containment basin up in Loma Alto in Altadena. And I wondered, you know, has that been thoroughly tested? And why would you remove soil from a Superfund site and put it somewhere else?

MR. SLATEN: We're not moving soil. I think what you're talking about in the Arroyo Seco, which is off JPL, which doesn't belong to us, there are activities going on all the time, and they are related to maintenance of the Arroyo Seco and so forth. There is also -- it shows there's an old gravel pit down there off JPL.

When the -- the waste disposal practices on JPL, which you saw were well up in the middle, that they dug a pit, and in this gravel, they put stuff in and let it soak straight down.

We do monitoring of all of our groundwater -- I'm sorry. We do monitoring of all the surface water runoff

from JPL constantly now. There have been samples taken down in the Arroyo. There's not been contamination found in the surface.

What I'm talking about where we know that the chemicals are is in the deep groundwater, hundreds of feet below the Arroyo. So unless they dig a couple hundred feet deep or more in the Arroyo, there won't be an issue with the chemicals from JPL.

MS. DERRY: Mary Derry from La Canada.

I have a question about whether you have decided where you're going to put these treatment plants. Most of what's right next to JPL is the Hahamongna watershed park, and those are pretty big industrial looking plants on the slide.

MR. SLATEN: Yes. The plants are going in the middle of JPL. They are -- they are taking up a few park -- they will be taking up a few parking spots. You saw them.

Sure, let's go back.

Keith, can you flip back to one of the photographs?

Give you an idea. Well, first of all, flip forward just a second.

Okay. See the dark purple spot up in the middle? It's going to be between buildings that are two or three stories high, between the middle of the building, taking up

a few parking spots.

And flip back, Keith. And let's see.

And as you can see, there's people standing there. So this one, which is a pretty big system, right, Keith, bigger probably than what we're talking about. It's about 12 or 15 feet of that structure. I'm not sure ours will have a structure like that. It gives you an idea. I would say this is on-site, and it's going to be dwarfed by the buildings around it. I doubt you'll be able to see this unless you fly over in a helicopter.

So it's not in the Arroyo Seco, and it's not directly adjacent to it.

There will be some construction activities, however. Go ahead and just make it clear, that since the water will be pumped up over off-site in the other side of the Arroyo Seco, pipeline will need to be built through the existing parking lot and brought over onto JPL property. So the pipeline will not go in what's the gravel part of the Arroyo, but will need to be built through the existing parking lot.

MS. DERRY: Any chance of getting those big white VOC tanks out of this?

MR. SLATEN: Those VOC tanks were purchased -- were paid for by NASA in about 1990 for the City of Pasadena to use to get out those volatile organic compounds that we

were talking about earlier. Those are not in use now since those wells have been shut down for a few years. They've been sitting there. And actually, they belong to the City of Pasadena, and it's their decision what to do with them.

MS. DERRY: Will the water be reinjected on JPL's property too?

MR. SLATEN: Yes. In the first phase, absolutely. Definitely up in the middle. On the second phase, it was going to be taken over to the west side of JPL property for reinjection.

MS. DERRY: Thank you.

UNIDENTIFIED SPEAKER: Following up on the question about the claims for a moment.

Does the two million dollar figure represent the best estimate on actual liquidation (inaudible), damages for Pasadena, or is that just a place holder number for the City?

MS. CURRY: The two million represents all of the costs that we have estimated, both in replacement water, lost opportunities to take advantage of some of the pumping discounts that the Metropolitan Water District provides to us. So it's all of the costs that we were able to identify that we have had over and above what we would have had had we had the use of the groundwater.

MR. ROGERS: Hi. Toby Rogers. I'm from the east part of Pasadena.

I appreciate all that you folks are doing to clean up the groundwater. I'm still trying to get a sense of the big picture.

I have a multi-part question, which is how much toxic chemicals were dumped in the first place? How much is still there? How much do you anticipate having to clean up? And for each of the three chemicals that you mentioned, at how many parts per billion are they toxic or are they a threat to public health?

MS. FELLOWS: Do you want to take a shot?

MR. SLATEN: Yeah. Let me try to get it started.

Since this occurred 50 plus years ago, the initial use of seepage pits, I think we can make some estimate as to the amount that was put in there, but hundreds of gallons of these chemicals, I'm sure, were used and dumped, if not more.

We have had a program to clean up on-site, to remove as much as we could in the soil there on-site. That has been going on for several years and that has been successful.

MR. ROGERS: Are there records from that period of time, in the '40s?

MR. SLATEN: No.

MR. ROGERS: Okay. How much is still to be cleaned up? Of those hundreds of gallons, how many -- I mean, if you're going to be doing this cleaning process, how many gallons do you expect to remove?

MR. SLATEN: There are millions of gallons of groundwater that will be pumped up to be cleaned up. It's an area that you saw that covers many acres and a fairly thick aquifer. So there's going to be millions of gallons of groundwater, which most of it are contaminants, very low levels, sometimes very low levels. They will all need to be pumped up and cleaned.

UNIDENTIFIED SPEAKER: (Inaudible)?

MS. FELLOWS: He asked, "What's the time frame?"

MR. SLATEN: The time frame is we're getting started as soon as we can, but it's going to take years, maybe tens of years, to finish this. What we'll do by getting started is contain it, keep it from going any further, keep the source from adding any more, and start the final cleanup.

So, in the meantime, the water will be treated and made clean, but until we can leave the aquifer back the way we found it, it's going to take years, if not decades.

MR. ROGERS: And the toxicity question, the three chemicals, how toxic are they? How much per billion?

MR. SLATEN: Yeah. Let Jeff answer.

MR. O'KEEFE: The carbon tetrachloride and trichloroethylene both are the volatile organics. They both have an MCL, that's a maximum contaminant level. And the carbon tet is at 0.5 parts per billion, and the TCE is the other one, that's at five parts per billion.

Now, those standards -- I'm not a toxicologist or anything. I'm a civil engineer. But those standards are set at a level that is considered protective of public health based on a lifetime exposure of consumption. There's some assumptions of drinking two liters per day over a lifetime. And those primarily are cancer-causing chemicals.

Perchlorate does not yet have a standard, but for the time being, we have a placeholder called an action level. And we've set that standard, or action level, at four parts per billion.

Now, later this year, the EPA will be publishing, or NAS, National Academy of Sciences, will be studying -- publishing a report which will be considered the best information on health effects of that chemical, and the State of California will then adopt an MCL, probably later this year.

We do have another representative from our office of the environmental hazard -- health and hazard -- I always put an "and" -- Health Hazard Assessment Office, and

they are also involved with this regulatory setting process. And they -- you know, they have toxicologists that review health studies to recommend a level that is safe, which their level is called public health goal.

So for now, we're working with the public health goal between two and six parts per billion. And there will be more information later this year to allow us to set an MCL for perchlorate.

I hope that wasn't too detailed. Sorry.

MS. FELLOWS: Council Tyler.

MR. TYLER: Thank you. Sid Tyler of Pasadena City Council. I represent the southwest portion of the city.

Could you be more specific with respect to the nine wells?

Well, start, first of all, the two wells, the Arroyo and the 52, with respect to when your best estimate right now would be that those two wells could get back online, reinjecting treated water into the aquifer. And then, beyond that, what is your timetable for the remaining wells that we have had to close down in terms of getting them back up and going?

MR. SLATEN: Okay. Yes. Those wells, the two wells, we are planning to have the system up and running, cleaning the water and reinjecting it, by the end of the year, within a year.

The answer about the other wells is a little more complex. One of the jobs that I have, something that I have to do, is get out and find the full extent of the chemicals from JPL so that we are going to take responsibility for all the chemicals that came from JPL. And I haven't done that yet.

In the next few months, we're going to work with the City to put in monitoring wells, to try to find out exactly where the chemicals have flowed from JPL.

So we have to do that before we know what the full extent is of the chemical flow from JPL and the full extent of what we are responsible for.

MR. TYLER: Does that influence where you put the treatment facilities?

MR. SLATEN: The question was, "Does that influence where you put the treatment facilities?" And the answer is "no."

The treatment facilities are going on JPL property because there, we have the infrastructure, there, we have the electrical, there, we have the workers to work on it, and so forth. They are being put -- it's logical to put them on JPL instead of to put them in somebody else's backyard, to put them in somebody's neighborhood, or put them in the Arroyo. I think the right thing to do is bring the water up onto JPL, take care of it, and then reinject

it.

Does that answer the question?

UNIDENTIFIED SPEAKER: (Inaudible.)

MR. SLATEN: Yes.

An important point, David Amidei worked on this project last year. He's here.

Also, this is Keith that's running my slides. Keith Fields is a contractor. He's got a lot of background on this. I'm relatively new. So I rely on their help, whenever. They'll let me know.

So it is -- what we're saying is this is a removal action. This is to get out quickly, and to start -- to stop this problem from going further.

This removal action is not necessarily the final action that it's going to take to clean all this up. We're going to get started. We're going to watch how this works, and that will help us design the final action.

MR. TYLER: Okay. This is really what I was trying to get at. So I'm not hearing there is going to be a treatment facility right at those well sites; is that correct?

MR. SLATEN: That's correct. There will be a pipeline from those well sites to JPL where the treatment facility will be located.

MS. FELLOWS: Next question.

All right. Back in the back, and then we will get up to you.

UNIDENTIFIED SPEAKER: Rosie (inaudible). I'm with the City of Pasadena, the Parks and National Resources division.

And I wasn't clear on when option 2 would actually begin, or when does the decision for the biological solution occur.

From what I understand, you're going to begin, and you're going to be using the ion exchange option, but at what point or -- do you decide to go, and will that also be a plant that is also on the JPL campus, or is there another site for that?

MR. SLATEN: Both plants will be on JPL. The one for the on-site water is in the works now, and it's going to be constructed beginning next month and in by summertime.

The other plant for the off-site water will be located right next to the first plant. That's several months behind, to be in and operating within a year.

And the other question was -- oh, when do we choose which?

After we get proposals from contractors of how they would propose to bid -- to build the entire system, we'll look at all those proposals, and then we'll see which one of those we think works best, which one of those gives

us the best value in the system.

UNIDENTIFIED SPEAKER: I was hoping you could explain. We're on top of this groundwater, the Raymond Basin. What obstacles and what keeps the water so contained? Why doesn't the contamination just go everywhere? How do you know that it's just there? Do you just test only where the well is, other wells, and you test that, and it's fine and that makes you -- you figure out from that?

MR. SLATEN: Okay. It's kind of a hydrogeology question, which is what I love.

So, you know, below your feet, almost -- below your feet, everywhere, there is groundwater. In some places back East, it's a few inches below your feet. You dig a hole, you know you're going to find water.

Here, where we're talking about, it is a few hundred feet below your feet. There's groundwater that is sitting down there. Groundwater is one of the major resources for this country. We have a lot of groundwater, and it's very important, and it's important to be protected and restored, of course, what we're doing here.

So what happens, groundwater flows. The water below -- if you see the rocks and sand at the Arroyo Seco, just imagine that being way on down there underground. It's like a big sponge. And when the water comes down from the mountains, soaks in, it goes in, and it's caught in

this big sponge. But it's not -- it doesn't stay in one place. It does flow.

And so it will flow naturally downhill, towards the ocean, wherever it can flow. Sometimes it comes to the the surface in spring. That doesn't happen right around us here, but if you have ever seen a spring, that's groundwater that is coming to the surface.

So what happens in our neighborhood over there that really affects the groundwater flow is its use as a resource. It's being pumped up, and whenever you pump water in one place, that causes water to flow towards that pump, to replace the water that you pumped out of the ground.

So that's what's happening. The groundwater is flowing right now. In our area, it flows inches a day, maybe a foot a day, depending -- or more, depending on how close you are to one of these pumping wells.

So that's why it's important we get out there as soon as we can, to take care of this movement of these chemicals that are moving in the groundwater, stop them from moving any further, stop them from going to any more wells, and start to bring it back and clean it up.

UNIDENTIFIED SPEAKER: So it's not like a big lake down there. It's more like a sponge that's got a lot of rock in it?

MR. SLATEN: That's right. It's like a wet sponge that's soaked with water.

MS. FELLOWS: Back in the middle there. Three rows up.

MS. RICHARDSON: I'm Ingrid Richardson. I, too, live in Altadena on Crestford.

And you said that you were -- I live right over the contaminated area.

You made a statement that you were going to have meetings regarding health issues.

Have there been any health issues identified, or are there any particular health issues that you're concerned about?

MR. RIPPERDA: There were numerous people at the meeting last night who brought up health concerns, which is why Merrilee started off tonight's meetings saying that they're going to bring in some medical experts and toxicologists to talk to people who have health concerns.

These chemicals do cause problems. If you're exposed to them directly at high enough concentrations, the volatile organic compounds are cancer-causing agents, and the perchlorate can cause thyroid problems, you know, if you drink enough of it in high enough concentrations over a long enough period of time.

The water that you're getting now is safe. You

know, all the water purveyors have to meet the standards. And so if you live right on top of the aquifer, you're not actually being exposed to the water, because water companies are having to buy from other places to sell to you if the well is in a portion of the acquifer that is above the standards.

UNIDENTIFIED SPEAKER: This is probably redundant, but we're with the Lincoln Water Company, and maybe you can just repeat it.

There was something said about the Lincoln Water Company also in the yesterday meeting that that water is being tested and it's safe.

Did I understand that right?

MR. RIPPERDA: Yeah. The Lincoln Avenue Water Company, as all the water companies in the area and in the entire state, have to comply with all the State standards. So they monitor on a regular basis for a full suite of chemicals. Not just the chemicals we talked about tonight, but, you know, every chemical that the State or EPA think might cause health effects. All the water companies have to monitor for that regularly.

And as soon as they find a chemical that's above an action level and maximum contaminant level, that well has to be taken out of service until it can be treated, or that water has to be replaced with water from somewhere

else.

MS. FELLOWS: I'm trying to get to the people that haven't asked, but you have been waiting awhile.

Go ahead.

UNIDENTIFIED SPEAKER: I just want to know why has it taken so long for the water -- for you guys to get to this point?

MR. SLATEN: I'll repeat the question. Why has it taken so long to get to this point?

As I mentioned, perchlorate is what I would call an emerging chemical of concern for the last few years. We started finding out about it in the '90s. We started learning how to detect it. We started wondering about what its healths effects were, in talking about that. And then we started finding ways -- it's more difficult to treat. It's more difficult to take it out of the water.

So in the last few years, we found ways to do that. The science has advanced. We've done studies. We've done small scales where we pump up a few gallons a minute, and we've been successful in treating that and making it clean.

So it's just now the time is right. Now we're able to do something. If we had wanted -- no matter how hard we would have tried ten years or more ago to remove perchlorate, there wasn't a way that we really knew how to

do it right then. The time is right. We're stepping up. We're going to take care of the problem. NASA owns this problem. We recognize that. And we've got to do this to be good neighbors.

UNIDENTIFIED SPEAKER: It's wonderful what you're doing now. I have lived in the area since '59. Now, if there's a problem -- you mentioned about the health problems. We have had -- and if we count them, in my area, La Canada, Verdugo Hills (inaudible) Terrace, all of that area, there have been people that have passed from cancer.

We have always felt and were told that the water was some of the resource. We don't know. So it's really interesting that, all of a sudden, we're getting help now. So, hopefully, we will get it quick enough that some of the other younger people that are coming along will benefit from that.

MS. FELLOWS: I think that's our hope too.

MR. SLATEN: Yes. Thank you. We agree. We want to take care of this.

MS. FRANCIS: Hi.

MS. FELLOWS: Hi again. If you could say your names.

MS. FRANCIS: Elizabeth Francis. I live in Altadena, but I do get Pasadena water.

I was at the meeting last night, which gave a lot of information, good information.

What I want to say, and as I understand it, you are assuring us that we are now getting clean, treated water in our homes, and that, in a few weeks, you will start a removal action to get the perchlorate out of the -- how long is it going to take to clean the perchlorate by the removal action that you're going to start?

MR. SLATEN: Okay. Yeah.

When we start pumping the water, the first time it comes through our system, it's going to come out clean. So for the water that we pump up, it's going to be immediately cleaned up. So that starts to give you an idea, that's part of the answer.

The answer is how long will it take to get it all out is what I was talking about earlier. We are talking about years before this is finished. We can get started, we can control it, but until it's all out of the ground and we can leave and leave that ground as clean -- that groundwater as clean as we found it, it's going to take many years.

MS. MILLER: My name is Valerie Miller. I live in South Pasadena. And this will be quick.

MS. FELLOWS: It's okay.

MS. MILLER: Okay. Continuing on the same idea, once the aquifer is clean, does that mean that the seven other wells that are closed will then be pumping from a clean

water source, or might they need separate pumping than what you're doing now?

It's all connected down there. So as you clean, it will (inaudible).

MR. SLATEN: Once we control this and then prevent any further migration, anybody who has any other groundwater rights, any other groundwater wells, can use them as they need to be used.

So I guess the answer is "yes." When we finish, we -- and we leave, we're going to leave it clean. And then anybody who wants to go anywhere in there and drill and use that water, it will be clean.

Was that your question?

MS. MILLER: Would you agree? Okay.

MS. COMPTON: Hello. I'm Cynthia Compton. I work at JPL.

I understand that perchlorate has fairly recently become detectable, and the technology to treat it is also fairly new technology.

And so my questions are surrounding around the perchlorate. One is what other site is it that they are cleaning up perchlorate, and what types of volume of cleanup are they handling, and what methods are they using, and what types of success studies have come from those other cleanup sites?

Is it published somewhere? Is your evaluation of which option to use for your perchlorate cleanup method based on those studies, and is that information available for us?

MS. FELLOWS: So you're asking about other places in the state. Not just locally.

MR. SLATEN: Yeah. There were a lot of "yes" answers there. There were a lot of questions there.

UNIDENTIFIED SPEAKER: And I just want to follow up with, will you be continuing to evaluate as new technologies arise?

MR. SLATEN: Of course. My job, as the NASA project manager, is the person who works for the United States Government that is paid by you. It's my job to try to make this project work the best and the fastest and with the best technology and using your money the best way possible. I don't know how to answer it other than that.

If I were to not consider new technology or the better ways to do things, I wouldn't be doing my job for you correctly.

MR. O'KEEFE: Yes. Our department has permitted several facilities, many of which are here in L.A. County, the Baldwin Park operable unit is another similar Superfund site in the San Gabriel Valley.

And right now, I think we have three plants on

line, and they're all using ion exchange treatment technology, and we have another that's about ready to go online this spring.

And they are similar in size as these facilities, 5,000 gallons per minute, and that -- probably from about that range? -- 2500 to 5,000. And for this plan, I'm not exactly sure of the size, 4,000 gallons per minute. So it's similar in scale.

As far as the biological process, I mentioned earlier, we have been -- we reviewed the operation of a plant up in Rancho Cordova, which is in the Sacramento area. And I'm not exactly sure of the size of that plant, but it's probably similar.

And we have more of our research oriented branch -- 6,000. Okay.

We have a research oriented branch in -- located in both of our Berkeley and Sacramento offices that oversee emerging treatment technologies. We review a lot of pilot scale, demonstration scale, full scale types of studies, and we evaluate whether we think that they can be used in a drinking water application. And if so, what are the operating restrictions on how that facility must operate?

In the case of the biological process, I think you saw on Steve's slide there was a filtering step after the bioreactor. That's because of DHS requirements for

some post-treatment, which would also include disinfection as another post-treatment requirement.

So we're very much involved in looking at new technologies and their application for drinking water use.

I do have more information for you. On our website -- I don't know. Have you ever seen our website? We don't get a lot of hits. But anyway, I do have a printout from our main website page, and this will direct you to a nice -- a short summary of perchlorate in California, where it's been detected, and more information on perchlorate.

And I know the EPA -- I had printouts with me, but I didn't bring them. But the EPA also has very good links to some general information about perchlorate, where it's been detected, what types of treatment technologies there are for removal.

I can get that to you at my office. I can give this to you now, and if you would like the other EPA information, I can pass that along to you. Okay.

MS. FELLOWS: Cynthia, did you have follow-up?

MR. SLATEN: Okay. Let me just add. I think there are links to his website on our website. So I think you probably got our website address. We have had it up here. There's lots of information about perchlorate. I've been looking through lots of stuff and seeing there are dozens

of places in the state where it has been found in groundwater. There's just a wealth of information that's out there. The web is a wonderful tool.

MS. FELLOWS: Let's go back to just straight ahead of you.

MR. PELLETIER: My name is Jason Peletier, and I actually live in Los Angeles, and I have a question about surface water quality.

One of the charts that you showed seemed to show that the distance between the surface, say the Arroyo Seco and the groundwater is about 200 feet; 200, 250. And also, I suspect you cleaned up most of the soil contamination on-site, either through vapor extraction or removing it.

That being the case, I just want to confirm, are there any ways whatsoever, any places where the contamination on-site affects either surface water in streams or springs or through runoff during the storm drains or anything like that?

MR. SLATEN: Good. JPL does constant monitoring of runoff from the entire site now. Under the permits they have, National Pollution Discharge Elimination System, NPDES, that all the water that flows off-site is monitored for all kinds of things all the time. And they know -- and they meet all -- everything. They have not been finding things flowing off-site.

So the answer is today, we watch everything, and things are not continuing to flow. We have not seen things in the past that have flown -- that have -- from surface rain water runoff. We have not seen them go into the Arroyo Seco. So what we're dealing with is a deep subsurface issue.

MS. FELLOWS: Before I take another question, I know it's cold in here. Is there still coffee back there?

If anybody wants to go get a cup of coffee, come back.

UNIDENTIFIED SPEAKER: We're not supposed to bring food or drink.

MS. FELLOWS: (Inaudible.)

MR. SLATEN: I think she was asking for one for her, actually.

MS. FELLOWS: No, I wasn't, actually. And a bunch of you have already asked. I'm still trying to get some of the newcomers and then when it slows down, I'll get back to you.

UNIDENTIFIED SPEAKER: Similar to the first water question, talk to me about the dirt and the surface dirt that comes south with the flow of water and the way the water flows through the Arroyo.

I work in Oak Grove Park during the summertime with a bunch of children, so we're interested in knowing

dirt levels and whether that is affected in any way.

MR. SLATEN: There have been samplings out in the Arroyo, the dirt out in the Arroyo by JPL, and it has not found any chemicals out there. So I don't know how to say it again without just saying it. We're talking about a deep subsurface thing; that chemicals were put in a 30-foot deep pit right in the middle of the site, and went down. They weren't poured over and into the Arroyo. It was much more convenient to have them out of sight, out of mind, right there in a pit.

So the Arroyo and other people working on the Arroyo all the time, there are things going on in there. There's maintenance on seepage basins to help water soak in there. You will see activities down there all the time. It's a very active -- when water goes through there, it moves dirt and all that is going on all the time, but there's not surface contamination from JPL in there.

MS. FELLOWS: Melody, do you want to go next, and then we'll go back to Michelle.

UNIDENTIFIED SPEAKER: Hi. I have a question. Last night, there were probably four neighborhoods represented, people telling us of clusters of cancer, victims who have died and people who have cancer currently. And the focus of this meeting has been on the perchlorate.

Well, I want to take the focus back to what has

finally tonight been identified as cancer-causing agents or compounds.

And I've been a resident and my family has been here for 40 years. So I'm concerned about the level of protection that people have or have had who are residents 50 years or 40 years before -- I mean, you're saying that, just ten years ago, or whenever you discovered perchlorate, there was a point in time when you did not know about the volatile compounds that are cancer causing.

Now, to me, this is a lawsuit in the making. And I feel like I'm in an Erin Brockovich movie. I'm concerned about when they discovered those two cancer-causing agents.

Are you aware of the date?

MS. FELLOWS: Mark?

MR. RIPPERDA: The cancer-causing agents started to be regulated by both EPA and (inaudible) I think in the mid '80s. Is that right, Alan?

MR. SORSHER: (Inaudible) exactly. I think there were state laws in the late '70s, early '80s, when these came up and (inaudible).

MR. RIPPERDA: And Alan's another engineer with Department of Health Services. I was just conferring with him a little bit. Or so he says.

UNIDENTIFIED SPEAKER: What did he say?

MR. RIPPERDA: I'm going to repeat it.

The California and EPA started regulating the cancer-causing agents in the late '70s, early '80s. And the Lincoln Avenue water wells and the Pasadena wells that had hits of the volatile organic compounds, the TCE and the carbon tetrachloride, were taken out of service sometime in the early '80s. And then -- so they weren't being used, and Pasadena and Lincoln Avenue had to find alternative sources of water at that time.

UNIDENTIFIED SPEAKER: (Inaudible.)

MR. RIPPERDA: And then -- but finally -- you know, Alan is like giving me information as I talk. But I was getting to that.

So in 1991, NASA paid for an air stripper for the Pasadena wells so those wells could be used again. And then a few years after that, NASA finally reimbursed Lincoln Avenue for its air stripper toward volatile organic compounds treatment system.

But those wells that had the cancer-causing agents were taken out of service sometime -- and I don't know exactly when -- but sometime in the early to mid '80s.

UNIDENTIFIED SPEAKER: So there's 20 years.

MR. RIPPERDA: Right. We don't know what the levels were before that time, how much people might have been exposed to.

MS. FELLOWS: I'm going to Michelle next and then --

UNIDENTIFIED SPEAKER: I understand that Colorado River water now also has perchlorate in it, and if this is the water that we're purchasing from the MWD to make up for our water, is mixing water that has a lower level of perchlorate in just so you stay just underneath the line of how much is allowable?

MR. RIPPERDA: Kind of. You're right. The Colorado River water does have perchlorate in it. It comes from the Las Vegas wash. There was a plant there that produced perchlorate for the military and (inaudible) and so perchlorate got into Lake Mead and then into the Colorado River water.

The Colorado River water is right around that action level of four to six parts per billion. And the water -- and this is something I learned from Bob Hayward from Lincoln Avenue last night -- the water that Lincoln Avenue and Pasadena buy from MWD is a mixture of both the Colorado River water and the Northern California water that comes down, which has zero perchlorate in it.

So the water that the local citizens here are getting from MWD is well below the action level, is well below the four parts per billion.

MS. WALDEN: Hi. My name is Monique Walden.

I just wanted to know: We continuously talk

about perchlorate. Is it a combination of other chemicals, or is it an individual compound?

MR. SLATEN: It is a compound. The chemical formula is oxygen with four chlorate (phonetic). So -- I'm sorry. Okay. CLO4. So it is a compound. It provides -- the reason it works well is it provides oxygen for combustion of fuels.

UNIDENTIFIED SPEAKER: Okay. I did go to the EPA website and, thank you, it was very informative. It gave a lot of detailed information.

It did mention, however, other chemicals that were found down in JPL, which included Mercury, Freon, and sulfuric acid.

Did we address any of those other chemicals as well?

MS. FELLOWS: Mark.

MR. RIPPERDA: (Inaudible).

When we list a site as a Superfund site, we don't just look at what we already know about it. We require that facility to go in and look for everything. So we do a complete record search of all the chemicals that people will admit to using, any record that they bought or disposed of materials. We interview employees for what they use. So there's a whole list of chemicals on our website that we look for.

We also sample for that in all the water and none of that laundry list of chemicals is found in any kind of health effect level in any of the drinking water.

And we also look for it in the surface soils, and we didn't find it in any kind of level that would adversely affect health.

UNIDENTIFIED SPEAKER: Thank you.

MS. HORN: My question is, like you said -- my name is Sandra Horn.

None of the chemicals that you two were speaking of were found to be at a health risk level, you said. But of those that are not at a health risk level, if you combine -- if you combine them all, is it then a health risk?

MR. RIPPERDA: That's a really important point in how we do risk assessments. You can't just look at a single chemical. You have to look at the combined effect of all of them.

So, yeah, we do look at combined effect, and all those chemicals -- I don't remember the exact -- but I think -- I think most of them were at nondetect. So in the drinking water sources, you couldn't even detect them. So they were used at JPL, but they are not showing up in the drinking water.

MR. SLATEN: The good news is, I guess, we know what

we're looking for. It's a few chemicals. We know how to find them. We know how to clean them up now. We've got the money and the will to do it. So I guess that's the good news.

MS. ROGERS: I'm really concerned. I'm Sharon Rogers, from Pasadena.

Who is responsible for looking at the health concerns? I'm not just concerned about cancer. I'm concerned about autism, and some of the developmental delays that we see in the schools and the increase that has occurred in the last few years. I think it's a very serious concern for all of us.

Is that -- is the EPA working on that? Are they relating it to this water problem?

MR. RIPPERDA: Both EPA and the State of California look at all these chemicals and try to figure out their effects on health. So independent of what's happening at NASA, JPL, our agencies, our toxicologists, studies, chemicals, they do laboratory experiments. So they set the actual limits that the water purveyors have to meet.

So that has nothing to do with what NASA is doing here. That's our scientists, you know, back in Washington DC and in all the labs, and the California scientists. So they set the limits based on their research, and then the water purveyors have to meet those

limits.

UNIDENTIFIED SPEAKER: Are you answering the question about autism?

MR. RIPPERDA: No.

UNIDENTIFIED SPEAKER: (Inaudible.)

MR. RIPPERDA: Oh, are we -- yes. That's one thing that the researchers look at, autism and cancer, and all -- anything that we can think of that might cause a health based concern, you know, we're looking at it.

MR. COLLINS: Thank you. Michael Collins, Pasadena Weekly.

I'm not sure which person to ask this question to -- this is awfully loud. Instead of trying to chase you all down, there's been a lot of talk about perchlorate tonight. I don't know if I missed part of the presentation. But have you discussed in detail or do you have any diagrams showing the trichloroethylene or TCE plume up at JPL?

I have a multi-part question.

MR. SLATEN: Okay. And I apologize. I was over talking to this lady off to the side, and I didn't hear the first part of the question.

MS. FELLOWS: He's with the Pasadena Weekly and -- you may have come in late. He wants to know if there's a plume of PCEs.

MR. COLLINS: I was just wondering in your presentation if you discussed TCE problems, trichloroethylene, and considering the volatile organic and vaporize up to the soil and collect in dwellings at quite high concentrations, is it dangerous to human health.

So I guess I'm going to bunch up my question. Does JPL currently monitor its buildings for concentrations of airborne trichloroethylene due to the conclusion of TCE on-site?

MR. SLATEN: Let me see. I don't know the answer to that. I will check into it and find out.

MS. FELLOWS: You can call us tomorrow.

MR. RIPPERDA: I can answer a little bit of that.

At least, under the Superfund cleanup, I know they are not monitoring for TCE or any of its breakdown byproducts of the buildings, but we don't expect it in any of the buildings based on our findings from what are called soil vapor monitoring points. We didn't find the TCE at near surface levels. So it's gotten into groundwater which is 200 feet below the surface, and the TCE vapors don't come from 200 feet back into the building.

MR. COLLINS: So in your vapor extraction units, you do test for TCE on-site?

MR. RIPPERDA: Yes.

MR. COLLINS: And do you have tables for those

readings; do you actually have reports?

MR. RIPPERDA: Yeah. For that kind of data, you will have to talk to Steve back in his office. And they do have data for the soil vapor monitoring and soil vapor extractions.

MR. COLLINS: Right. But -- but you did say that there's no testing of the interiors of the building at JPL currently for TCE vapors?

UNIDENTIFIED SPEAKER: They do test in one building.

UNIDENTIFIED SPEAKER: They do test in one building.

MR. COLLINS: What building would that be?

MS. FELLOWS: Since Cynthia doesn't have a mike, maybe you could talk to her afterwards and we can --

MR. SLATEN: So to correct what you just -- the statement you just made, no. I don't know. I will find out.

MR. COLLINS: Oh, I'm sorry.

MS. FELLOWS: Michael, you reminded me of another thing. The data we do have, which was discussed tonight in the more recent variety, but all the monitoring data, all the reports we have, we are willing to make available to anybody (inaudible). We are willing to help you interpret them from our point of view. If you want to make copies and take them to your own experts, we're willing to make them available to you.

MR. COLLINS: Okay.

MS. FELLOWS: I'm sorry. I think we got your name earlier. Sandra Warren.

You guys running down, or you want to take one or two more questions?

There's one back there.

UNIDENTIFIED SPEAKER: Hi. Tim (inaudible). I'm from Pasadena.

I've been involved in dealing with this problem, really, since I was first on the Utility Commission in 1979, and I have been Pasadena's representative for the Metropolitan Water District for 19 years now.

So the issue of perchlorate and -- well, perchlorate just came up in recent years, but it was the VOCs before. And these issues, obviously, are very tough issues for the water industry to deal with and for everyone to deal with.

And I've been a strong critic of the approach that has been taken here in the past in urging for greater action and quicker action, really, for 25 years on this problem.

So it's with great pleasure tonight that I see the kind of new commitment. I think -- this has been a cloud hanging over our community for many years. But tonight, I really see a can-do attitude, a solution driven

approach from NASA. And I just really want to say how pleased I am to see that approach coming from NASA and how strongly we'll support you in order to get this contamination cleaned up, and how strongly we'll stay on your case to make sure that it gets done.

Thank you.

MS. FELLOWS: Thank you. We hear both sides of that. Thank you.

UNIDENTIFIED SPEAKER: I just want to make it clear -- clarify that our next meeting will be in two months?

MS. FELLOWS: Yes.

UNIDENTIFIED SPEAKER: And how will we be notified? By mail or --

MS. FELLOWS: We'll notify everybody that we got on the sign-in tonight, plus all the people we already have on the mailing list.

So if you received a brochure in the mail, you're also already on it. If you didn't, then make sure you and your neighbors -- make sure everybody takes comment cards home, mail them in with addresses.

And when I say "two months," we're shooting for two months. We do want to have a lot of experts that can address your issues. So coordinating that many people is going to take a little while, so we'll find out which dates are best. We started today, so -- and we'll go over the

issues that's you raised tonight, including some of the autism and other health effect issues.

UNIDENTIFIED SPEAKER: Thank you.

MS. FELLOWS: Okay. I think we'll wrap it up for tonight.

As you know, this is only the first volley of many, and we really appreciate you coming. We learned a lot. And we would like you to fill out evaluation forms. That's very important in our effort to getting back to you.

Thank you.

(The 9:24 p.m., the proceedings adjourned.)

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STATE OF CALIFORNIA)
) ss.
COUNTY OF LOS ANGELES)

I, ANN BONNETTE-SMITH, C.S.R. No. 6108, do hereby certify:

That said Transcript of Proceedings was taken before me at the time and place therein set forth and was taken down by me in shorthand and thereafter was transcribed into typewriting under my direction and supervision, and I hereby certify the foregoing transcript is a full, true and correct transcript of my shorthand notes so taken.

I further certify that I am neither counsel for nor related to any party to said action, nor in any way interested in the outcome thereof.

IN WITNESS WHEREOF, I have hereunto subscribed my name this _____ day of _____, 2004.

_____

ANN BONNETTE-SMITH